EMPRES WATCH
emergency prevention systems

Rift Valley Fever could spread with movement of animals from East Africa

RVF is a per-acute or acute disease of domestic ruminants, caused by a mosquito-borne virus and characterised by hepatic necrosis and internal haemorrhages. The severity and degree of clinical signs may vary according to age or breeds of the animals affected, with infections usually unapparent or mild in adults but high mortality rates in new-born animals and abortions in pregnant animals[1]. RVF is a zoonotic disease and humans become infected through contact with tissues of infected animals or mosquito bites. Infection in humans is usually associated with mild to moderately severe influenza-like illness, but severe complications such as retinal damage and blindness, encephalitis or haemorrhagic disease occur in about 1% of patients. The case fatality rate in humans can be considerable.

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1 More information on the clinical signs of RVF and its differential diagnostic can be found in the FAO manual available at the following address; http://www.fao.org/DOCREP/006/Y4611E/Y4611E00.HTM

1. Increase of RVF activity in 2006-2007 in East Africa

RVF is known to be endemic in most of the sub-Saharan countries. Between epidemic waves, RVF virus circulates at very low incidence without noticeable clinical manifestation, neither in human nor in animal. In southern and eastern Africa, epidemics of RVF have been observed at irregular intervals of about 5–12 years. They tend to occur over large areas in the flood plain zones and in irrigated areas.

In East Africa, epidemics have been associated with above average rainfall favouring the breeding of the mosquito vectors of RVF. This has been the case in late 2006 and early 2007, when El Niño-driven rainfalls dramatically affected the Horn of Africa, with subsequent flooding and RVF outbreaks in Kenya, Somalia and Tanzania. About 1000 infected people were officially reported, of whom 323 died (WHO WER n.20). The impact on the livestock sector was also very high, both directly with significant death rates in young ruminants and abortions, and indirectly through the ban on consumption of products and the collapse of trade.

In mid-October 2007, Rift Valley fever cases in humans were detected in the Kosti district, White Nile state of Sudan, in the same area indicated in the historical report of 1973. This part of Sudan has experienced sub-normal rainfall in recent months. Serological tests were positive on samples from goats and sheep, and the Ministry for Animal Resources and Fisheries declared the infection in ruminants to the OIE (Office International des Epizooties) on 11 November.

2. Forecasting and early warning

In East Africa, remote sensing data can be used to estimate unusual rainfall and consequent vegetation growth translated in Vegetation Index maps. These data are used to predict RVF activity before it reaches epidemic proportions. The following figures

illustrate the highest values of NDVI (normalized difference vegetation index) in autumn 2006, when RVF emerged, compared to the same period in 2005.

Figure 1. Images from NOAA satellite showing NDVI, in December 2005 (A) and in December 2006 (B). Source: Artemis, FAO

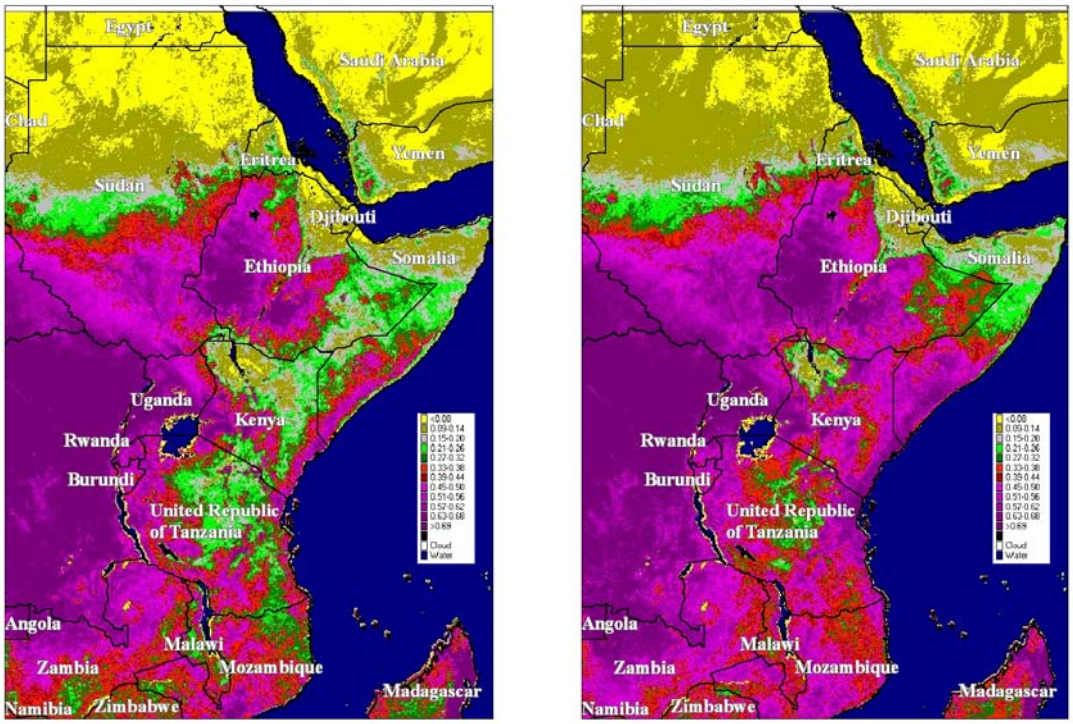
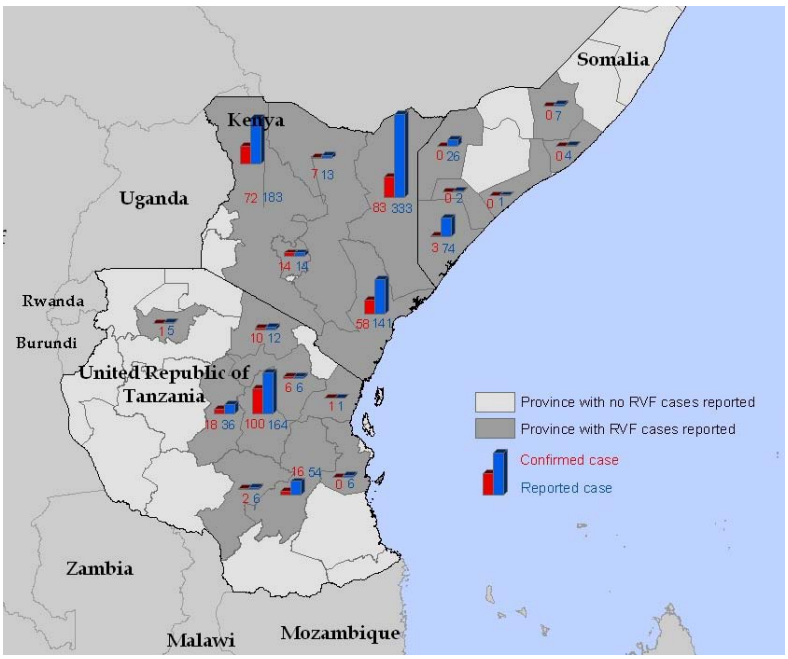
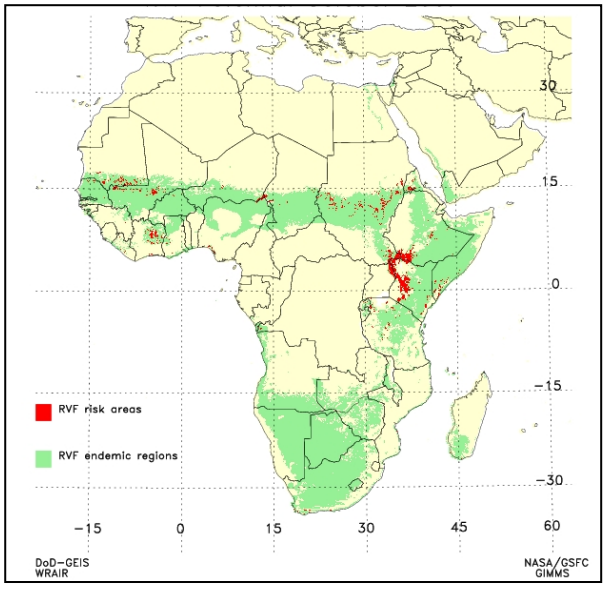


Figure 2. Geographical distribution of RVF human cases in Kenya, Somalia and United Republic of Tanzania in 2006-2007.
Source: WHO Weekly Epidemiological Record N 20, 2007, 82, 169-180



Based on the persistence of anomalies in the Vegetation Index derived from AVHRR and SPOT vegetation satellites, RVF monthly risk maps are produced by the NASA Goddard Space Flight Center[2]. These maps allowed FAO and WHO to deliver a warning message in November 2006, indicating that the risk of RVF was very high in Tanzania, Somalia and Kenya, a few weeks before the first cases were reported in these countries. The signals were almost identical for August 2007, indicating an elevated risk of RVF over the western Rift Valley region and parts of coastal Kenya, central and southeastern Sudan area bordering Kenya, and southern Ethiopia. Figure 3 illustrates the last RVF map for October 2007.

Figure 3: RVF Potential in October 2007



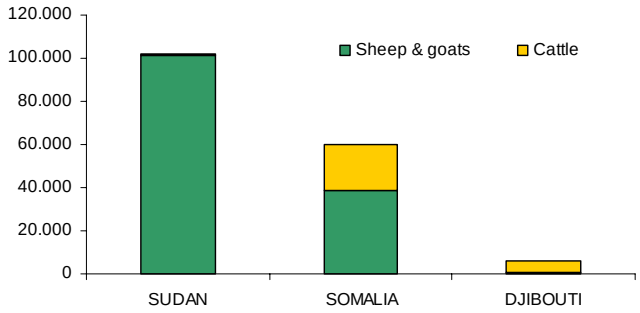
Areas shown in red indicate areas at risk of RVF activity; those shown in green are those within an RVF endemic region or in areas where RVF virus has been identified; those shown in yellow are not at risk
Credit: A.Anyamba, NASA Goddard Space Flight Center

Projections suggest that the El Niño event behind unusual rainfalls at the beginning of the year is now over. Mosquito populations are expected to decrease in abundance, but the disease may still continue, especially in irrigated areas where mosquito breeding sites will persist.

3. Potential for further spread of the disease in the region

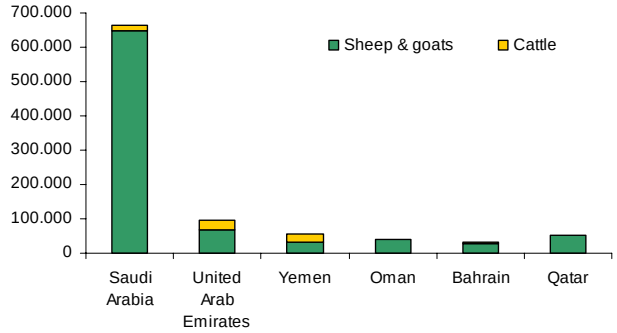
With the celebration of the festival of Eid on 20 December 2007, it is expected that there will be a large trade flux of livestock moving from the African eastern region to the Arabian Peninsula, Saudi Arabia and Yemen in particular. Sudan and Somalia are the two countries of the Horn of Africa with the biggest volume of livestock exports (cattle. sheep and goats). Saudi Arabia is the biggest market of the region receiving most of the livestock exports coming from the Horn of Africa (Figures 4 and 5), and volume has been stable over the years. Compared to small ruminants, international export of cattle are of limited importance, with the highest volumes from Ethiopia to Somalia and from Somalia to United Arab Emirates and Yemen.

Figure 4. Main livestock export from the Horn of Africa in 2005 (in thousands of US$)



Source; International Trade Center UNCTAD / WTO - http://www.intracen.org
UN TRADE DATABASE - http://comtrade.un.org

Figure 5. Main livestock import in the countries of the Persia Gulf in 2005 (in thousands of US$)



Source; International Trade Center UNCTAD / WTO - http://www.intracen.org
UN TRADE DATABASE - http://comtrade.un.org

2 These maps are available at http://www.geis.fhp.osd.mil/GEIS/SurveillanceActivities/RVFWeb/infopages/updateRVF.asp

The main livestock trade routes identified in the region include:

- Sudan to Saudi Arabia: In 2005, exports of small ruminants accounted for 23.3 % of total Sudanese exports, which indicates the high economic importance of this sector in the trade balance of the country. Saudi Arabia accounts for 99% of Sudanese small ruminants exports. In contrast, the export of cattle is very weak. The volume of sheep and goats imported to Saudi Arabia from Sudan has been quite stable over the last five years, although affected by competition from Syria and Australia.

- Somalia to Yemen: Somali exports of livestock include cattle (35%) and sheep and goats (62%). The main market is Yemen, which covers 85% of total livestock exports from Somalia, but other destinations such as United Arab Emirates and Oman are also of significant importance. It should be added that Yemen can be a stop-over point for small ruminants on their way to Mecca.

The following map summarizes the main trade movements of livestock (cattle and small ruminants) in the region.

Figure 6. Schematic routes of small ruminants between the Horn of Africa and Persia Gulf

In conclusion, the activity of RVF virus is still high in parts of East Africa region and could further disseminate in the region through the transboundary movement of animals. Countries in the region should stay on heightened alert for the appearance of syndromes that are consistent with Rift Valley fever infections and increase their surveillance activities. Guidelines for safe import of animals and products have been developed by the OIE and should be followed[3].

Finally, with the increased movement of animals at this period of the year, it is not only the dissemination of Rift Valley fever that is of concern, but also the introduction of other animal diseases such as **foot-and-mouth disease** and its various exotic sub-types, **brucellosis**, **peste des petits ruminants**, **contagious bovine** or **caprine pleuropneumonia**, **camel pox** and other **capripox** viruses. We are confident that **rinderpest** has been eradicated from the African continent and the Arabian Peninsula, but its last "footprint" was seen in the Somali Ecosystem, and any evidence of syndromes that resemble stomatitis-enteritis should be urgently reported for further investigation to EMPRES and sample submission (contact EMPRES-shipping-service@fao.org) to a FAO or OIE reference centre. This Shipping Service will cover charges for confirmation and pathogen characterisation of any transboundary animal disease suspicion at our specialised centres.

4. Recommendations

Countries located in high risk areas of RVF and those which recently experienced RVF should activate and increase disease surveillance according to OIE standards in particular those countries located in areas associated with the previous occurrence of RVF. If there are no reports of clinical signs compatible with RVF, disease surveillance should focus on mosquitoes and serology of susceptible ruminants. FAO encourages these countries to activate their early warning, prevention and contingency plans. As part of these plans, efforts must be focused on the increase of public awareness by using adequate communication tools to reach all kind of people in close contact with livestock and populations at high risk such as abattoirs workers and veterinary staff.

Importing countries of meat or animals from RVF risk areas should not apply trade restrictions if disease surveillance is in place in countries/zones at risk with negative results. The OIE standards separate "RVF

3 Terrestrial Animal Health Code, chapter 2.2.14

infection free country or zone" from "RVF infected countries/zones without disease". In the first case, the country is out of the historical distribution area, a surveillance programme is in place and 4 years have elapsed since the last epidemic. In the second, the country is considered free, disease has not occurred in humans and animals in the past 6 months and climatic changes predisposing to outbreaks of RVF have not occurred during this time. A third classification is "RVF infected country/zone with disease", meaning clinical disease in humans and animals has occurred within the past 6 months. Even in presence of disease or infection, the OIE Terrestrial Animal Health Code accepts trade of ruminants and meat from infected countries if certain specific conditions of quarantine or vaccination are met. This is based on timely and prompt notification of infection or disease to the OIE. More details can be found in the OIE Terrestrial Animal Health Code. Finally, the certificates for safe export of ruminant, meat and meat products have been recently reviewed with the countries of the Horn of Africa, their neighbours and countries from Middle East during a Workshop organised by OIE in collaboration with FAO and IBAR.

5. References

In addition, we offer you these links for improved technical information:

Rift Valley Fever

http://www.fao.org/ag/againfo/programmes/en/empres/disease_rvf.asp

http://www.cotf.edu/ete/modules/rift/rift.html

http://www.fao.org//DOCREP/005/Y4140E/Y4140E00.HTM

http://www.fao.org/docs/eims/upload/217874/EW_hornafrica_nov06_rvf.pdf

Foot-and-Mouth Disease

http://www.fao.org/ag/againfo/programmes/en/empres/disease_fmd.asp

http://www.fao.org/DOCREP/006/Y4382E/Y4382E00.HTM

http://www.fao.org/docs/eims/upload//225050/Focus_ON_1_07_en.pdf

Contagious Bovine Pleuropneumonia

http://www.fao.org/ag/againfo/programmes/en/empres/disease_cbpp.asp

Contagious Caprine Pleuropneumonia

http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/ccpp.html

Sheep and Goat Pox

http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/sgp.html

Brucellosis

http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/brucellosi-ov.html

ftp://ftp.fao.org/docrep/fao/005/y4723E/y4723E00.pdf

http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/brucellosi-bo.html

Zoonoses

ftp://ftp.fao.org/docrep/fao/006/y4962t/y4962t00.pdf